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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/855,483 | 05/15/2001 | Richard J. Tomaszewski | P01-3573 | 9601 |

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| EXAMINER | |
|---|---|
| MCLEAN MAYO, KIMBERLY N | |
| **ART UNIT** | **PAPER NUMBER** |
| 2187 | |

DATE MAILED: 07/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

(Supplemental)

**Office Action Summary**

| Application No. | Applicant(s) | |
|---|---|---|
| 09/855,483 | TOMASZEWSKI ET AL. | |
| **Examiner** | **Art Unit** | |
| Kimberly N. McLean-Mayo | 2187 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,2,4-7,10-12,14-16,18,19 and 27-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-7,10-12,14-16,18,19,27-32 and 40* is/are rejected.

7)☒ Claim(s) *33-39 and 41-47* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 27, 2004 has been entered.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2, 4-6, 10-12, 14-16, 18-19, 27-32 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paterson et al. (USPN: 6,412,042) in view of DeKoning (USPN: 5,787,242) and Van Huben et al. (PGPUB: US 2002/0083299).

Regarding claim 1, Paterson discloses a plurality of concentric tracks defined on a disk (C 6, L 56-58); the disk including at least two data storage areas (Figure 7B, References 76,78), wherein each area is sized to store a copy of a set of data and the data storage areas are substantially equidistantly spaced from each other (C 7, L 17-19, L 39-44; Figure 7B illustrates the data storage areas substantially equidistantly spaced from each other) and wherein all of the at least two data storage areas are located within plus or minus one track of the same track (Figure 7B illustrates the data storage areas within tracks which are adjacent each other) and a drive

mechanism coupled to the disk (Figure 1, Reference 10). Paterson does not disclose a controller in communication with the drive mechanism for keeping track of deferred writes to the at least two data storage areas of the disk thereby maintaining data coherency between the at least two data storage areas. However, DeKoning teaches the concept of a controller in communication with a drive mechanism for keeping track of deferred writes (pinned data) to data storage areas of the disk, which maintains data coherency between the at least two data storage areas (C 5, L 1-56). This feature taught by DeKoning saves data to be written to a disk storage area when the storage area cannot be written to thereby ensuring accuracy [coherency] and proper operation of the system. Hence, it would have been obvious to one of ordinary skill in the art to use DeKoning's teachings with the system taught by Paterson for the desirable purpose of accuracy and ensuring proper operation of the system in the event of failures. DeKoning does not explicitly disclose a remote controller performing the above features. However, Van Hueben discloses the concept of a remote controller maintaining coherency between data storage areas. This feature provides a means of improving general data accesses to a unified memory thereby providing improved performance. Additionally, a remote controller provides increased reliability by providing redundant functionality of a local controller. One of ordinary skill in the art would have recognized the benefits of having a remote controller and would have been motivated to add such a feature to the system taught by Paterson for the desirable purpose of improved performance and increased reliability.

Regarding claim 2, Paterson discloses the at least two data storage areas are located at radially opposed locations at a substantially 180 degree angular offset with respect to a spin axis (spin

axis of the spindle) of the rotating data storage disk and mirrored across the spin axis (Figure 7B illustrates the data storage areas located at radially opposed locations, [with respect to the spindle which is located at the center of the disk, refer to Figure 3], at a substantially 180 degree angular offset, wherein the data storage areas are mirrored across the spin axis [the data storage areas are mirrored across the spindle and thus are mirrored across the spin axis]).

Regarding claim 4, Paterson discloses the disk comprising at least two magnetic recording surfaces (Figure 3, Reference 23 corresponding to each Reference 22), wherein the data storage areas are formed in one of the at least two magnetic recording surfaces (C 7, L 46-48, L 50-52).

Regarding claim 5, Paterson discloses the disk further comprising at least two magnetic recording surfaces (Figure 3, Reference 23 corresponding to each Reference 22), wherein the data storage areas are formed in separate ones of the at least two magnetic recording surfaces (Figure 7C, C 7, L 46-48, L 53-57, L 61-66).

Regarding claim 6, Paterson discloses the disk further comprising an optical recording surface (C 20, L 50-52; CD-ROMS are optical drives with optical recording surfaces).

Regarding claim 10, Paterson discloses the at least two data storage areas comprising a number "n" of storage areas and the disk exhibiting a characteristic virtual revolutions per minute (RPM) that is a multiple n of the actual spin speed of the rotating data storage disk (Figure 7B illustrates the at least two data storage areas comprising two storage areas [References 76, 78] and

accordingly, since the data storage areas are mirrored at adjacent locations 180 degrees from each other, the read latency is reduced 50 % and the virtual spin speed is 2x the actual spin speed).

Regarding claim 11, Paterson discloses one or more platters, each platter supporting at least one recording surface, wherein the platters are aligned about a common central axis (axis of the spindle) (C 7, 59-60; C 6, L 36-42; Figure 3, References 22); a plurality of concentric tracks defined on the platter (C 6, L 56-58); means for spinning the platters about the common central axis (Figure 3, Reference 12; C 5, L 59-61); a recording head associated with each recording surface (Figure 3, Reference 28; C 5, L 61-62; C 6, L 39); an actuator mechanism coupled to each recording head (via Reference 26) to move the recording head into proximity with selected portions of the recording surface in response to received commands (Figure 3, Reference 14; C 6, L 20-30); and at least two replicates of data stored in at least two data storage areas (Figure 7B, References 76, 78) such that any one of the at least two replicates can be accessed to service a data access request (C 11, 36-52) and all of the at least two data storage areas are located within plus or minus one track of the same track (Figure 7B illustrates References 76 and 78 as adjacent to one another). Paterson does not disclose a controller for keeping track of deferred writes to the data storage areas, thereby maintaining data coherency. However, DeKoning teaches the concept of a controller for keeping track of deferred writes (pinned data) to data storage areas of the disk, thereby maintaining data coherency (C 5, L 1-56). This feature taught by DeKoning saves data to be written to a disk storage area when the storage area can not be written to thereby ensuring accuracy [coherency] and proper operation of the system. Hence, it

would have been obvious to one of ordinary skill in the art to use DeKoning's teachings with the system taught by Paterson for the desirable purpose of accuracy and ensuring proper operation of the system in the event of failures. This feature taught by DeKoning saves data to be written to a disk storage area when the storage area cannot be written to thereby ensuring accuracy [coherency] and proper operation of the system. Hence, it would have been obvious to one of ordinary skill in the art to use DeKoning's teachings with the system taught by Paterson for the desirable purpose of accuracy and ensuring proper operation of the system in the event of failures. DeKoning does not explicitly disclose a remote controller performing the above features. However, Van Hueben discloses the concept of a remote controller maintaining coherency between data storage areas. This feature provides a means of improving general data accesses to a unified memory thereby providing improved performance. Additionally, a remote controller provides increased reliability by providing redundant functionality of a local controller. One of ordinary skill in the art would have recognized the benefits of having a remote controller and would have been motivated to add such a feature to the system taught by Paterson for the desirable purpose of improved performance and increased reliability.

Regarding claim 12, Paterson discloses the data storage areas are located so as to be mirrored about the spin axis of the platters (Figure 7B illustrates References 76 and 78 mirrored about the spin axis of the platters).

Regarding claim 14, Paterson discloses the data storage areas formed in a single one of the one or more platters (Figure 7B; C 7, L 46-48, L 50-52).

Regarding claim 15, Paterson discloses the data storage areas formed in separate platters of the one or more platters (Figure 7C, C 7, L 46-48, L 53-57, L 61-66).

Regarding claim 16, Paterson discloses each recording surface comprising a plurality of concentric tracks defined on the recording surface and each track is substantially aligned with a corresponding track on an adjacent platter (Figure 3 illustrates the platters centered about the spindle thereby substantially aligning the platters and the tracks of the platters), wherein all of the at least two data storage areas are located on adjacent tracks (Figure 7B illustrates the at least two data storage areas, References 76 and 78, on adjacent tracks).

Claim 18 is rejected for the same rationale applied to claim 10 above.

Regarding claim 19, Paterson discloses a command processor having an interface to receive external disk access requests and coupled to provide the commands to the actuator mechanism (Figure 8, Reference 82; the processor receives disk access requests from Reference 60 and the processor provides commands to actuator, Reference 54); and memory coupled to the command processor (Figure 8, Reference 80; C 8, L 7-11) and configured to store redundant write access request commands such that the at least two replicates can be stored asynchronously (C 11, L 64-66; C 12, L 8-14; Figure 12, Reference 142 and 148 – the data corresponding to the write request

is duplicated in the memory, wherein the write data and the duplicated write data are effectively executed as a write command and a duplicated (redundant) write command when the write data and the duplicated write data are removed from the memory and thus the write data and the duplicate (redundant) write data stored in the memory represent the write command and the redundant write command respectively).

Regarding claim 27, Paterson discloses a disk controller (Figure 4, Reference 56) in communication with a disk comprising a command port for receiving access request (signal line coupled between References 56 and 60 in Figure 4; C 6, L 50-55); a command processor for executing software processes (instructions stored in ROM, Reference 84, in Figure 8)(Figure 8, Reference 82; C 8, L 11-17); a first process executing in the command processor for replicating a received disk access request, wherein the first process generates a replicated access request that refers to a track adjacent to a track referred to by the access request (instructions stored in ROM, [Reference 84, Figure 8], which perform the features described in C 11, L 39-41, C 11, L 67; C 12, L 1–5, L 8-10; Figure 12, Reference 148 for a disk which is setup as shown in Figure 7B, wherein the two data storage areas are located adjacently, References 76 and 78 are located in adjacent tracks); a second process executing in the command processor for executing at least one of the received disk access request and replicated disk access request against a disk drive (instructions in ROM (84) which perform the features described in Figure 12, References 146 and 150; C 12, L 5-8, L 10-14). Paterson does not disclose means for keeping track of deferred writes to the disk, which thereby maintains data coherency. However, DeKoning discloses means for keeping track of deferred writes to the disk, thereby maintaining data coherency (C 5,

L 1-56). This feature taught by DeKoning saves data to be written to a disk storage area when the storage area is not able to be written to thereby ensuring accuracy and proper operation of the system. Hence, it would have been obvious to one of ordinary skill in the art to use DeKoning's teachings with the system taught by Paterson for the desirable purpose of accuracy and ensuring proper operation of the system in the event of failures.

Regarding claims 28-29, Paterson discloses the first process comprises causing the processor to determine radially opposed locations within the disk and to determine adjacent tracks within the disk suitable for the disk access request (C 11, L 67; C 12, L 1–5; referring to Figure 7B, the data locations within the disk are located at radially opposed locations and are located on adjacent tracks and thus when the processor determines locations [Figure 7B, References 76, 78] suitable for the disk access request from the lookup table, the processor intrinsically determines locations at radially opposed locations within the disks and locations located on adjacent tracks).

Regarding claim 30, Paterson discloses the second process receiving the determined radially opposed locations and executes the at least one disk access request at the determined location (C 12, L 5-8, L 10-14 – the second process writes data to the data locations and thus it is evident that the second process receives the locations).

Regarding claim 31, Paterson discloses a redundant data table (locations within Reference 80 in Figure 8 where the duplicated data is stored) holding one or more pending write access requests (C 12, L 8-10 - Reference 80 stores duplicated write data, the duplicated write data is executed as

a write command when removed from the memory and therefore also represents the write command) and coupled to the second process (via Reference 82 in Figure 8) such that the second process can execute the received disk access request and the replicated disk access request asynchronously (C 12, L 5-8, L 10-14).

Regarding claims 32 and 40, Paterson discloses an integrated controller that manages data storage operations of the disk drive (Figure 4, Reference 56).

4. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paterson et al. (USPN: 6,412,042) in view of DeKoning (USPN: 5,787,242) as applied to claim 1 above and further in view of Takahashi et al. (USPN: 5,707,727).

Paterson and DeKoning disclose the limitations cited above, however, Paterson and DeKoning do not explicitly disclose the disk further comprising a magneto-optical recording surface. Takahashi discloses the use of a magneto-optical recording surface (Abstract) as a recording method that provides a large capacity memory (C 2, L 35-38). Paterson teaches that the invention is applicable to other storage media (C 20, L 50-52) and hence it would have been obvious to one of ordinary skill in the art to use a magneto-optical disk drive in the system taught by Paterson for the desirable purpose of providing a large capacity memory.

### *Allowable Subject Matter*

5. Claims 33-39 and 41-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### *Response to Arguments*

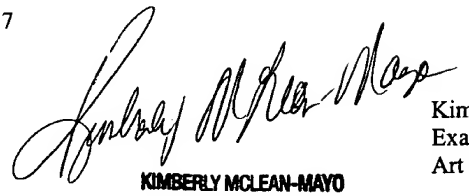
6. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly N. McLean-Mayo whose telephone number is 703-308-9592. The examiner can normally be reached on M-F (9:00 - 6:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 703-308-1756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).




Kimberly N. McLean-Mayo
Examiner
Art Unit 2187

KNM

March 19, 2004